DOCKET NO.: 192592US0NPP CONT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE
IN RE APPLICATION OF :

MICHEL M. LADANG, ET AL. : EXAMINER: GOFF II, JOHN L.

SERIAL NO: 09/580,874 :

FILED: MAY 30, 2000 : GROUP ART UNIT: 1733

FOR: PROCESS FOR PREPARING A CROSSLINKED POLYOLEFIN FOAM

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the second non-Final Rejection of the claims dated April 26, 2005.

I. REAL PARTIES IN INTEREST

The real parties in interest are Norton S.A. Performances Plastics, Chaineux, Belgium, by virtue of the assignment recorded May 26, 2005, at Reel/Frame 016600/0926.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and their assignee are not aware of any other appeals, interferences or judicial proceedings which will directly affect or be directly affected by or having a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

The status of each claim in the present application is listed below:

Claims 1-9, 11-12, 14, and 18-19 are canceled.

Claims 10, 13, and 15-16 are pending and rejected.

Claim 17 is withdrawn from consideration.

Thus, the appealed claims are Claims 1-9 and 21-22. The text of those claims is provided in the Claims Appendix.

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Office Action mailed on April 26, 2005.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

As recited in sole independent Claim 10, the present invention relates to a process for preparing a sheet of a crosslinked polyolefin foam expanded unidirectionally only in its thickness (page 4, lines 22-34 and page 4, lines 17-19), comprising:

surface-crosslinking both faces of an unsupported intermediate polyolefin sheet to be expanded so that its degree of surface crosslinking is different from its core, these faces being perpendicular to the direction of expansion (page 6, lines 10-15), and

expanding and crosslinking the so formed sheet only in its thickness (page 11, lines 5-14).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Whether Claims 10 and 15 are unpatentable under 35 U.S.C. §103(a) over Tsujimoto et al. (JP 04-21334, as evidenced by the English translation, PTO 03-2661,

hereafter JP '334) in view of either Hosoda et al. (U.S. Patent No. 3,608,006, hereafter US '006) or Miyazaki et al. (JP 09-150431, as evidenced by English Abstract, hereafter JP '431) and the alleged admitted prior art (see response filed August 24, 2004, page 5, lines 21-25 and page 6, lines 1-11).

(2) Whether Claim 13 is unpatentable under 35 U.S.C. §103(a) over JP '334 in view of either US '006 or JP '431, and in further view of Hitchcock (U.S. Patent No. 5,087,395, hereafter US '395).

(3) Whether Claim 16 is unpatentable under 35 U.S.C. §103(a) over JP '334 in view of either US '006 or JP '431, and in further view of Hurley et al. (U.S. Patent No. 5,883,145, hereafter US '145).

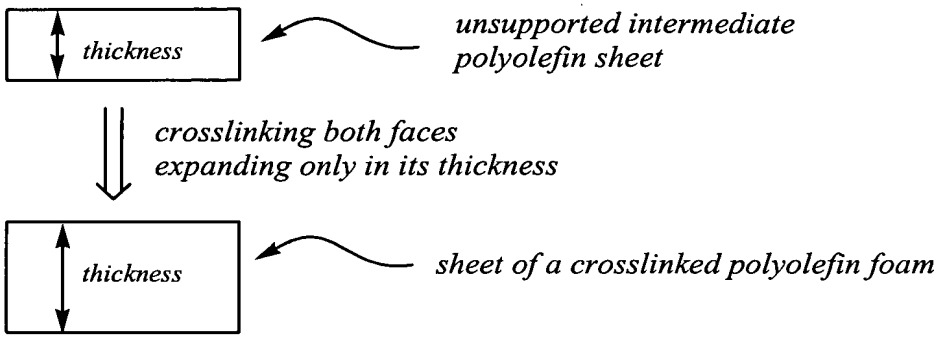
VII. ARGUMENT

The rejections under 35 U.S.C. § 103(a) as unpatentable of:

(1) Claims 10 and 15 over JP '341 in view of either US '006 or JP '431 and the alleged admission; (2) Claim 13 over JP '341 in view of either US '006 or JP '431, and in further view of US '395; and (3) Claim 16 over JP '341 in view of either US '006 or JP '431, and in further view of US '145 are all respectfully traversed.

The present invention is directed to a process for preparing a sheet of a crosslinked polyolefin foam expanded unidirectionally only in its thickness, comprising surface-crosslinking both faces of an unsupported intermediate polyolefin sheet to be expanded so that its degree of surface crosslinking is different from its core, these faces being perpendicular to the direction of expansion, and expanding and crosslinking the so formed sheet only in its thickness. This process is schematically shown below.

Schematic of Claimed Process



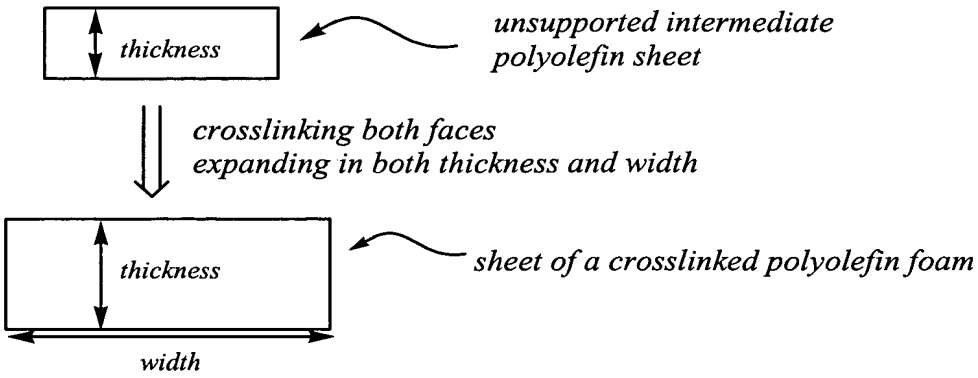
The process of unidirectionally expanding a surface crosslinked polyolefin sheet provides a solution to a problem that is encountered in continuous production operations. In these conventional processes, when expansion occurs in the same direction in which the sheet is driven; the driving speed of the material must be different at the upstream and downstream ends (page 3, lines 22-34). This complicates the overall production process, and may give rise to defects in the resultant foamed material. The claimed process also provides the ability to produce polyolefin foam sheets without having a liner adhered thereto. These aspects and advantages are not disclosed or suggested in the references of record.

JP '341 discloses irradiating an expandable polyolefin sheet with low voltage radiation, followed by expansion of a polyolefin sheet, which occurs both in the thickness and the width of the film (see PTO '661, page 6, ¶ 15).[1] The Board's attention is directed to the disclosed data which unequivocally demonstrates that JP '341 does not disclose unidirectional expansion (see PTO '661, pages 9-10, ¶¶ 31-32), in which the extruded product has a thickness of 3 mm and a width of 450 mm prior to expansion; but subsequent to expansion the thickness of the sheet is 7 mm and the width is 800 mm. In terms of percentages, JP '341 discloses a process in which there is a 133% increase in the thickness and a 78% increase in

[1] The following discussion concerning JP '341 refers to pinpoint citations that refer to the English translation provided by the Office (PTO 03-2661, hereafter PTO '661).

the width upon expansion, which corresponds to a 30-fold foaming expansion (see PTO '661, page 10, ¶ 31). A schematic of the process disclosed in JP '341 appears below, which is not drawn to scale to reflect the percentage change in width and thickness.

Schematic of Process Disclosed in JP '341



not drawn to scale

When one considers that the entire disclosure of JP '341 does not refer, or even allude, to unidirectional expansion, it is clear that this disclosure is insufficient to support a prima facie case of obviousness. This illustrates the how the Office has erred in its position. The Office has admitted that JP '341 does not disclose unidirectional expansion (see April 26, 2005 Office Action, page 3, lines 6-8), but has taken the position that JP '341 is not limited to unidirectional expansion. By assuming that JP '341 is not limited to unidirectional expansion, the Office concludes that this deficiency may be satisfied by viewing the disclosures of either US '006 or JP '431, in view of Applicants' alleged admission concerning *essentially unidirectional expansion.*

The disclosures of US '006 and JP '431 disclose unidirectional expansion is made possible be adhering an expandable polyolefin to a liner (US '006) or laminating a thermoplastic resin to a sheet material (JP '431).

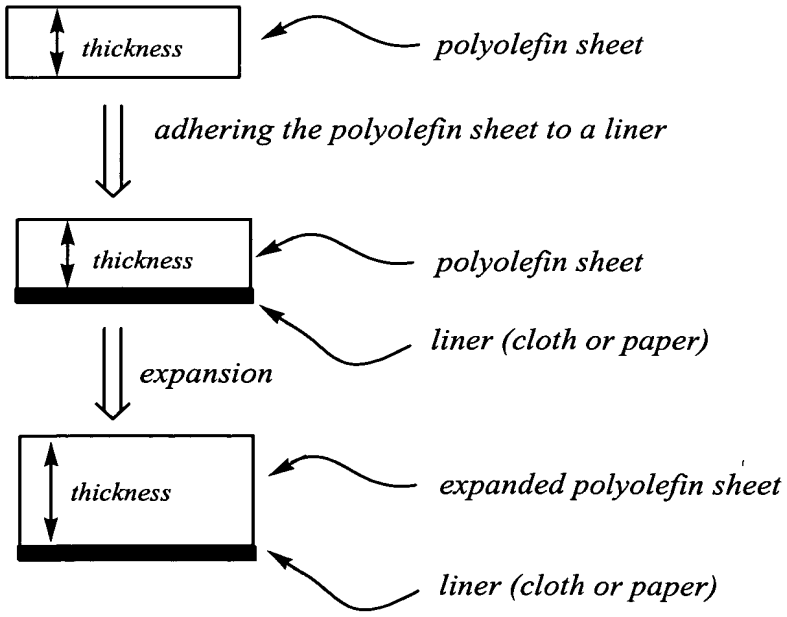
US '006 discloses a process for the production of a foamed polyolefin composite sheet, which comprises a polyolefin foam adhered to a liner, such as cloth or paper (see

Abstract). Specifically, US '006 discloses a process for producing a thin polyolefin sheet having a low density by a process that includes (col. 1, lines 43-52, emphasis added):

> milling the polyolefin with a cross-linking agent and a blowing agent, moulding the resulting composition into a sheet, **adhering** the sheet with a lining such as, cloth and paper, and then heating the resulting composite at a temperature higher than decomposition temperatures of the cross-linking agent and the blowing agent to form cross-linkage and foam and thereafter subjecting to embossing.

Appellants emphasize the adhering aspect of the process disclosed in US '006 because it illustrates an important distinction. The Board's attention is directed to the following passage in US '006, which states that strong adhesion between the foam and the lining occurs because "the foamed layer is incorporated with the lining" (see US '006, col. 1, lines 73-74), and because of this strong adhesion expansion of the composition occurs in the direction of the thickness (see US '006, col. 2, lines 1-10). This aspect is schematically represented in the following diagram.

Schematic of process disclosed in US '006



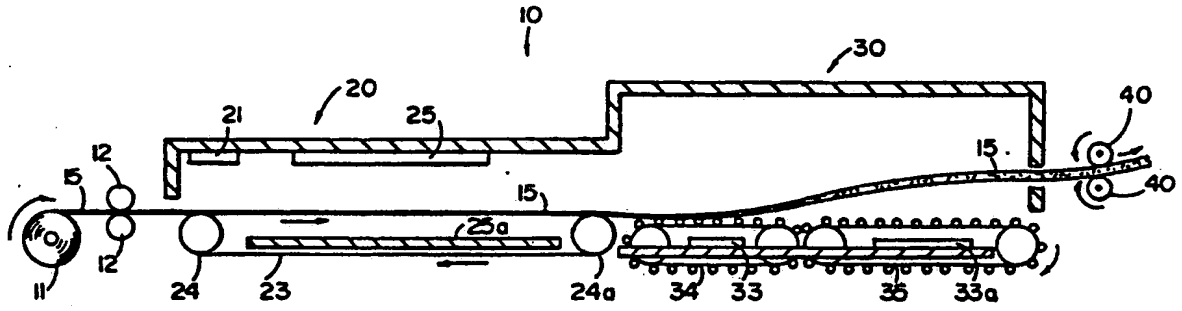
Thus, it should be clear that US '006 discloses a foamed polyolefin composite sheet, in which the liner is an integral part of the foamed polyolefin.

The disclosure of JP '431, as evidenced by the Abstract, discloses that at "least one side of a foamable thermoplastic resin sheet (7), containing a heat decomposition foaming agent, as a sheet material (3, 4), which has a strength enough to inhibit the sheet from being foamed in the in plane direction, [are] laminated and integrated together."

The Office has reasoned that the disclosures of US '006 and JP '431 exemplify that it is possible to obtain "a unidirectionally expanded foam sheet by providing a non-extensible support layer in a direction perpendicular to an expansion direction" (see April 26, 2005 Office Action, page 3, lines 11-12), and that Applicants' claimed process for unidirectional expansion would have been achievable by routine experimentation. It appears that the Office has relied upon Applicants' alleged admitted prior art (see response filed August 24, 2004, page 5, lines 21-25 and page 6, lines 1-11) pertaining to *essentially* unidirectional expansion. However, it is believed that these comments have been taken out of context, and are not applicable to the claimed expression pertaining to unidirectional expansion.

As noted above, JP '341 does not disclose or suggest a process involving unidirectional expansion and do not provide a suggestion on how to achieve this. The disclosures of US '006 and JP '431 state that unidirectional expansion is made possible by adhering a sheet (or liner) to an expandable material. In view of these disclosures, and Applicants comments concerning essentially unidirectional expansion, it is believed that there can be no issue of obviousness. The combined disclosures do not suggest the claimed process. Moreover, the combined disclosures do not recognize the advantages of a process in which an unsupported intermediate polyolefin sheet is bifacially surface-crosslinked in a manner that expansion occurs unidirectionally only in its thickness.

In regard to the rejection of Claim 13, since the claimed invention is believed to be unobvious over JP '341 in view of either US '006 or JP '431 and in further view of alleged admissions, as the combined disclosures do not suggest a method for expanding a surface crosslinked polyolefin sheet in a unidirectional manner. The disclosure of US '395 does not rectify this deficiency. The disclosure of US '395 is relied upon to show that it is possible to obtain a polyolefin foam by a continuous process (see US '395, Abstract). However, US '395 exemplifies the problems associated with a continuous process. As noted above, a continous process, in which unidirectional expansion in the thickness does not occur, requires a specialized apparatus that contains pulleys and variable speed capabilities. The Board's attention is directed Fig. 1 of US '395, which is reproduced below, and the text spanning col. 2, line 19 through col. 4, line 14.



US '395 in pertinent part discloses that a "radiation cross-lined thermoplastic resin sheet **15** containing a blowing agent is first fed to the preheating chamber **20** continuously from roll **11** by means of a pair of feed rolls **12**" (col. 2, lines 55-58), which is fed through the preheating chamber **20** by way of an "[e]ndless belt **23** [which] is extended horizontally between pulleys **24, 24a**" (col. 3, lines 2-3). The resin sheet **15** emerges from the preheating chamber **20** into a "[f]oaming chamber **30** [which] is provided with two separate conveyor means **34** and **35** which are operated at different speeds" (coo. 3, lines 61-62). The speed of the conveyors **34** and **35** depends on the degree of foaming and the foam rate (see col. 3, lines

62-67). US '395 further discloses that "[b]ecause the differential rate of foaming can cause some wrinkling of the sheet, as the sheet exits foaming oven **30**, it is nipped between pull rollers which advance at a rate of speed roughly equivalent to the forward rate of sheet **15** in order to maintain a substantially even pull on sheet **15** across the face of sheet **15**. This is important, because US '395 discloses that expansion occurs both in the thickness and in the width, as well as length, of thermoplastic resin. For instance, the sheet the departs from the roll **11** has a thickness of 0.06 – 0.8 inch and a width of 30 inches (see US '395, col. 5, lines 38-39). The resulting foam has "a thickness of 0.125 inch and a width of approximately 6 feet" (see US '395, col. 5, lines 58-60), which corresponds to "an expansion factor of about 30" (col. 5, line 60). Inspection of the diagram shows that various conveyor and pulleys are required in order to compensate for the degree of expansion in both the length and the width. Interestingly, the degree of expansion disclosed in US '395 is the same as that which is disclosed in JP '341 (see PTO '661, page 11, ¶ 34, line 4). In effect it can be concluded that US '395 and JP '341 disclose similar processes as evidenced by the identical degree of expansion. Therefore, when one combines JP '341 and US '006 along with US '395 one would have to add a roll of liner (i.e., paper or cloth) adjacent to the roll **11** shown in Fig. 1 of US '395 and adhere the resin and liner. While it seems that the process suggested by the combination of JP '341, US '006, and US '395 solve the problem of having conveyors operating at variable speeds, the fact is that one would obtain a product in which the foam is adhered to the liner to obtain a composite sheet. Likewise the combination of JP '341, JP '431, and US '395 likely obviates the problem of the conveyors, but requires that the expandable resin sheet and a sheet be laminated together.

In light of this combination of references, one can immediately appreciate how the presently claimed process provides a solution to a problem. When unidirectional expansion of an unsupported intermediate polyolefin sheet occurs only in its thickness, an apparatus

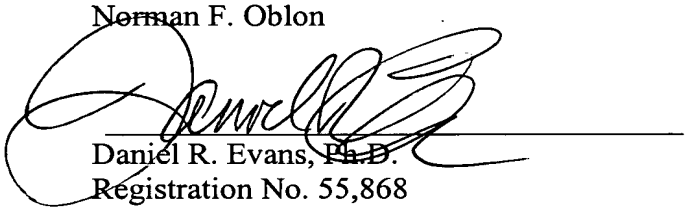
may run at a constant speed without having the complications associated with the same (see present Specification, page 3, lines 25-34).

Finally, in regard to the rejection of Claim 16, the claimed invention is believed to be unobvious over JP '341 in view of either US '006 or JP '431, as the combined references do not suggest a method for expanding a surface crosslinked polyolefin sheet in a unidirectional manner. US '145 is cited showing that it is known to crosslink very low density polyethylene, but there is little else that this reference contributes to the overall analysis that has not already been addressed above.

In view of the foregoing, all of the rejections of Claims 10, 13, and 15-16 discussed above should be REVERSED.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



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CLAIMS APPENDIX

The appealed claims read as follows:

10. A process for preparing a sheet of a crosslinked polyolefin foam expanded unidirectionally only in its thickness, comprising:

surface-crosslinking both faces of an unsupported intermediate polyolefin sheet to be expanded so that its degree of surface crosslinking is different from its core, these faces being perpendicular to the direction of expansion, and

expanding and crosslinking the so formed sheet only in its thickness.

13. The process according to Claim 10, carried out continuously.

15. The process according to Claim 10, wherein the polyolefin foam comprises at least 20% by weight of a polyethylene or of an essentially linear ethylene copolymer having a density of 0.80 to 0.96 g/cm^2.

16. The process according to Claim 15, wherein the polyethylene or ethylene copolymer is obtained by metallocene catalysis and has a density of at most 0.92 g/cm^3.